Please provide the following information, and submit to the NOAA DM Plan Repository.

Reference to Master DM Plan (if applicable)

As stated in Section IV, Requirement 1.3, DM Plans may be hierarchical. If this DM Plan inherits provisions from a higher-level DM Plan already submitted to the Repository, then this more-specific Plan only needs to provide information that differs from what was provided in the Master DM Plan.

URL of higher-level DM Plan (if any) as submitted to DM Plan Repository:

1. General Description of Data to be Managed

1.1. Name of the Data, data collection Project, or data-producing Program:

2006 Maryland Department of Natural Resources Lidar: Caroline, Kent and Queen Anne Counties

1.2. Summary description of the data:

Maryland Department of Natural Resources requested the collection of LIDAR data over Kent, Queen Anne and

Caroline Counties, MD. In response, EarthData acquired the data from March 18 through April 6, 2006.

Airborne lidar data was acquired at an altitude of 5,500'(1676.4 m) above mean terrain with a swath width of 40 degrees,

which yields an average post spacing of lidar points of no greater than 6.56 ft (2 m). The project was designed to

achieve a vertical accuracy of the lidar points at 7.09 in (18 cm) root mean square error (RMSE). The flight design

included a total of seventy-seven flight lines with approximately 2,246 total line miles (3614.59 km). The lidar

data was acquired prior to the emergence of deciduous foliage. This is a bare earth data set.

Light Detection and Ranging (LIDAR) is a method of locating objects on the ground using aerial-borne

equipment. It is similar to RADAR or SONAR in that the two-way travel time of an energy beam reflected off an

object is precisely measured, but this technology uses laser light instead of radio or sound waves. This technology has

proven very useful in remote sensing of the earth. It can be used for determining elevations of both the earth's surface

and items (natural and man-made) on the surface.

Analysis of LiDAR data is used in detailed modeling of the earth's surface for drainage and floodplain studies,

determining how a new structure will affect views from various locations, shoreline erosion studies, and other

reasons. "First returns" are the first elevation value that the LiDAR sensor recorded for a given x,y coordinate.

Likewise, "last returns" are the last elevation value that the LiDAR sensor recorded for a given x,y coordinate.

The Bare Earth Mass Points are point elevations that represent the "bare earth." Features that are above the

ground - such as buildings, bridges, tree tops, etc. - are not included in these data.

The Gridded DEM is a model of the surface of the earth (no above-surface features such as buildings, tree tops, etc)

with a point at every 2 meters representing the average surface elevation of that area.

The LIDAR Intensity Imagery are similar to aerial photography. While not as sharp as traditional aerial photos,

they offer a good visual representation of the surface and various features.

Original contact information:

Contact Name: Kevin Boone

Contact Org: Maryland Department of Natural Resources

Title: Chief GIS Officer

Phone: 410-260-8753

Email: kboone@dnr.state.md.us

1.3. Is this a one-time data collection, or an ongoing series of measurements?
One-time data collection

1.4. Actual or planned temporal coverage of the data:
2006-03-18 to 2006-04-06

1.5. Actual or planned geographic coverage of the data:
W: -76.300698, E: -75.688478, N: 39.383359, S: 38.729653

1.6. Type(s) of data:
(e.g., digital numeric data, imagery, photographs, video, audio, database, tabular data, etc.)

1.7. Data collection method(s):
(e.g., satellite, airplane, unmanned aerial system, radar, weather station, moored buoy, research vessel, autonomous underwater vehicle, animal tagging, manual surveys, enforcement activities, numerical model, etc.)

1.8. If data are from a NOAA Observing System of Record, indicate name of system:

1.8.1. If data are from another observing system, please specify:

2. Point of Contact for this Data Management Plan (author or maintainer)

2.1. Name:
NOAA Office for Coastal Management (NOAA/OCM)

2.2. Title:
Metadata Contact

2.3. Affiliation or facility:
NOAA Office for Coastal Management (NOAA/OCM)

2.4. E-mail address:
coastal.info@noaa.gov

2.5. Phone number:
(843) 740-1202

3. Responsible Party for Data Management
Program Managers, or their designee, shall be responsible for assuring the proper management of the data produced by their Program. Please indicate the responsible party below.

3.1. Name:

3.2. Title:
Data Steward

4. Resources
Programs must identify resources within their own budget for managing the data they produce.

4.1. Have resources for management of these data been identified?

4.2. Approximate percentage of the budget for these data devoted to data management (specify percentage or "unknown"):

5. Data Lineage and Quality

NOAA has issued Information Quality Guidelines for ensuring and maximizing the quality, objectivity, utility, and integrity of information which it disseminates.

5.1. Processing workflow of the data from collection or acquisition to making it publicly accessible

(describe or provide URL of description):

Process Steps:

- 2006-10-05 00:00:00 - EarthData has developed a unique method for processing lidar data to identify and remove elevation points falling on vegetation, buildings, and other aboveground structures. The algorithms for filtering data were utilized within EarthData's proprietary software and commercial software written by TerraSolid. This software suite of tools provides efficient processing for small to large-scale, projects and has been incorporated into ISO 9001 compliant production work flows. The following is a step-by-step breakdown of the process: 1. Using the lidar data set provided by EarthData, the technician performs calibrations on the data set. 2. Using the lidar data set provided by EarthData, the technician performed a visual inspection of the data to verify that the flight lines overlap correctly. The technician also verified that there were no voids, and that the data covered the project limits. The technician then selected a series of areas from the data set and inspected them where adjacent flight lines overlapped. These overlapping areas were merged and a process which utilizes 3-D Analyst and EarthData's proprietary software was run to detect and color code the differences in elevation values and profiles. The technician reviewed these plots and located the areas that contained systematic errors or distortions that were introduced by the lidar sensor. 3. Systematic distortions highlighted in step 2 were removed and the data was re-inspected. Corrections and adjustments can involve the application of angular deflection or compensation for curvature of the ground surface that can be introduced by crossing from one type of land cover to another. 4. The lidar data for each flight line was trimmed in batch for the removal of the overlap areas between flight lines. The data was checked against a control network to ensure that vertical requirements were maintained. Conversion to the client-specified datum and projections were then completed. The lidar flight line data sets were then segmented into adjoining tiles for batch processing and data management. 5. The initial batch-processing run removed 95% of points falling on vegetation. The algorithm also removed the points that fell on the edge of hard features such as structures, elevated roadways and bridges. 6. The operator interactively processed the data using lidar editing tools. During this final phase the operator generated a TIN based on a desired thematic layer to evaluate the automated classification performed in step 5. This allowed the operator to quickly re-classify points from one layer to another and recreate the TIN surface to see the effects of edits. Geo-referenced images were toggled on or off to aid the operator in identifying problem areas. The data was also examined with an automated profiling tool to aid the operator in the reclassification. 7. The final DEM was written to an LAS 1.0 format and also converted to ASCII 8. The point cloud data were also delivered in LAS 1.0 format and also converted to ASCII.

- 2006-11-20 00:00:00 - EarthData utilizes a combination of proprietary and COTS processes to generate intensity images from the lidar data. Intensity images are generated from the full points cloud (minus noise points) and the pixel width is typically matched to the post spacing of the lidar data to achieve the best resolution. The following steps are used to produce the intensity: 1) Lidar point cloud is tiled to the deliverable tile layout. 2) All noise points, spikes, and wells are deleted out of the tiles. 3) An EarthData proprietary piece of software, EEBN2TIF is then used to process out the intensity values of the lidar. At this point, the pixel size is selected based on best fit or to match the client specification if noted in the SOW. 4) The software then generates TIF and .TFW files for each tile. 5) ArcView is used to review and QC the tiles before delivery.
- 2008-11-03 00:00:00 - The NOAA Office for Coastal Management (OCM) received the files in las and ASCII format. The data were in Maryland State Plane Projection, NAVD88 vertical datum and the vertical units of measure were meters. OCM performed the following processing to the las data to make it available within Digital Coast: 1. The data were converted from Maryland State Plane coordinates to geographic coordinates. 2. The data were converted from NAVD88 (orthometric) heights to GRS80 (ellipsoid) heights using Geoid 03. 3. The LAS data were sorted by latitude and the headers were updated.

5.1.1. If data at different stages of the workflow, or products derived from these data, are subject to a separate data management plan, provide reference to other plan:

5.2. Quality control procedures employed (describe or provide URL of description):

6. Data Documentation

The EDMC Data Documentation Procedural Directive requires that NOAA data be well documented, specifies the use of ISO 19115 and related standards for documentation of new data, and provides links to resources and tools for metadata creation and validation.

6.1. Does metadata comply with EDMC Data Documentation directive?

No

6.1.1. If metadata are non-existent or non-compliant, please explain:

Missing/invalid information:
- 1.6. Type(s) of data
- 1.7. Data collection method(s)
- 3.1. Responsible Party for Data Management
- 4.1. Have resources for management of these data been identified?
- 4.2. Approximate percentage of the budget for these data devoted to data management
- 5.2. Quality control procedures employed
- 7.1. Do these data comply with the Data Access directive?

- 7.1.1. If data are not available or has limitations, has a Waiver been filed?
- 7.1.2. If there are limitations to data access, describe how data are protected
- 7.4. Approximate delay between data collection and dissemination
- 8.1. Actual or planned long-term data archive location
- 8.3. Approximate delay between data collection and submission to an archive facility
- 8.4. How will the data be protected from accidental or malicious modification or deletion prior to receipt by the archive?

6.2. Name of organization or facility providing metadata hosting:
NMFS Office of Science and Technology

6.2.1. If service is needed for metadata hosting, please indicate:

6.3. URL of metadata folder or data catalog, if known:
https://www.fisheries.noaa.gov/inport/item/49784

6.4. Process for producing and maintaining metadata
(describe or provide URL of description):
Metadata produced and maintained in accordance with the NOAA Data Documentation Procedural Directive: https://nosc.noaa.gov/EDMC/DAARWG/docs/EDMC_PD-Data_Documentation_v1.pdf

7. Data Access
NAO 212-15 states that access to environmental data may only be restricted when distribution is explicitly limited by law, regulation, policy (such as those applicable to personally identifiable information or protected critical infrastructure information or proprietary trade information) or by security requirements. The EDMC Data Access Procedural Directive contains specific guidance, recommends the use of open-standard, interoperable, non-proprietary web services, provides information about resources and tools to enable data access, and includes a Waiver to be submitted to justify any approach other than full, unrestricted public access.

7.1. Do these data comply with the Data Access directive?

7.1.1. If the data are not to be made available to the public at all, or with limitations, has a Waiver (Appendix A of Data Access directive) been filed?

7.1.2. If there are limitations to public data access, describe how data are protected from unauthorized access or disclosure:

7.2. Name of organization of facility providing data access:
NOAA Office for Coastal Management (NOAA/OCM)

7.2.1. If data hosting service is needed, please indicate:

7.2.2. URL of data access service, if known:
https://coast.noaa.gov/dataviewer/#/lidar/search/where:ID=103
https://coast.noaa.gov/htdata/lidar1_z/geoid18/data/103

7.3. Data access methods or services offered:
This data can be obtained on-line at the following URL: https://coast.noaa.gov/dataviewer;

7.4. Approximate delay between data collection and dissemination:

7.4.1. If delay is longer than latency of automated processing, indicate under what authority data access is delayed:

8. Data Preservation and Protection

The NOAA Procedure for Scientific Records Appraisal and Archive Approval describes how to identify, appraise and decide what scientific records are to be preserved in a NOAA archive.

8.1. Actual or planned long-term data archive location:
(Specify NCEI-MD, NCEI-CO, NCEI-NC, NCEI-MS, World Data Center (WDC) facility, Other, To Be Determined, Unable to Archive, or No Archiving Intended)

8.1.1. If World Data Center or Other, specify:

8.1.2. If To Be Determined, Unable to Archive or No Archiving Intended, explain:

8.2. Data storage facility prior to being sent to an archive facility (if any):
Office for Coastal Management - Charleston, SC

8.3. Approximate delay between data collection and submission to an archive facility:

8.4. How will the data be protected from accidental or malicious modification or deletion prior to receipt by the archive?
Discuss data back-up, disaster recovery/contingency planning, and off-site data storage relevant to the data collection

9. Additional Line Office or Staff Office Questions

Line and Staff Offices may extend this template by inserting additional questions in this section.